Organizing for Regional Transportation Operations:

Houston TranStar

Notice:

This document is disseminated under the sponsorship of the Department of Transportation in the interest of information exchange. The United States Government assumes no liability for its contents or use thereof.

Technical Report Documentation Page

1. Report No.	2. Government Accession No.	3. Recipient's Catalog No.
FHWA-OP-01-139		

4. Title and Subtitle	5. Report Date
Organizing for Regional Transportation Operations: Houston TranStar	August 2001
	6. Performing Organization Code: Booz·Allen & Hamilton Inc.

7. Author(s)	8. Performing Organization Report No.
Valerie Briggs, Keith Jasper	

9. Performing Organization Name and Address	10. Work Unit No. (TRAIS)
Booz·Allen & Hamilton Inc. 8283 Greensboro Drive McLean, Virginia 22102	11. Contract or Grant No.

12. Sponsoring Agency Name and Address	13. Type of Report and Period Covered
U.S. Department of Transportation Federal Highway Administration Office of Travel Management 400 Seventh Street, SW, Room 3401 Washington, DC 20590	Operations Dialogue Report September 2000-August 2001
	14. Sponsoring Agency Code

15. Supplementary Notes

Contracting Officer's Technical Representative (COTR) - Vince Pearce

16. Abstract

This is one of six case studies exploring regional cooperation among transportation operating organizations. These studies, developed in conjunction with the National Dialog on Transportation Operations, document alternative approaches for developing and sustaining regional transportation operations and portray institutional practices and lessons learned. They provide examples of experiences that reflect National Dialog goals of facilitating cultural transitions within transportation operating entities that are driven by system performance and customer service measures. They are intended to serve as a resource guide for decision-makers as well as transportation management and operations staff.

The six case studies associated with this project are TRANSCOM in New York, New Jersey, and Connecticut; TransLink in Vancouver, British Columbia; The Metropolitan Transportation Commission in the San Francisco Bay Area; The ITS Priority Corridor in Southern California; TranStar in Houston; and AZTech in Phoenix. Case studies were selected to present a variety of approaches that differ in regional size and characteristics, organizational structure, scope, and geography. An executive guide highlights the findings and perspectives of the six case studies.

17. Key Word	18. Distribution Statement
Transportation Operations, Regional Operating Organizations, Regional Operations, Institutional Issues, Partnerships, Regional Coalitions, Houston TranStar	No restrictions.

19. Security Classif. (of this report)	20. Security Classif. (of this page)	21. No. of Pages	22. Price
Unclassified	Unclassified	19	

Form DOT F 1700.7 (8-72) Reproduction of completed page authorized

CONTENTS

ACRONYMS

CCTV	Closed Circuit Television
City	City of Houston
CMAQ	Congestion Mitigation Air Quality
County	Harris County
DMS	Dynamic Message Sign
FHWA	Federal Highway Administration
FMS	Freeway Management System
FTA	Federal Transit Administration
HOV	High Occupancy Vehicle
ISP	Information Service Provider
ISTEA	Intermodal Surface Transportation Efficiency Act
ITS	Intelligent Transportation Systems
MAP	Motorist Assistance Program
METRO	Metropolitan Transit Authority
MPO	Metropolitan Planning Organization
MTC	Metropolitan Transportation Commission
OEM	Office of Emergency Management
ROO	Regional Operating Organization
STP	Surface Transportation Program
TTI	Texas Transportation Institute
TMC	Traffic Management Center
TRANSCOM	Transportation Operations Coordinating Committee
TxDOT	Texas Department of Transportation
U.S. DOT	United States Department of Transportation

OVERVIEW

This is one of six case studies exploring regional cooperation among transportation operating organizations developed in conjunction with the National Dialogue on Transportation Operations. These studies document alternative approaches for developing and sustaining regional transportation operations and portray institutional successful practices and lessons learned. They provide examples of experiences that reflect National Dialogue goals of facilitating cultural transitions within transportation operating entities that are driven by system performance and customer service measures. They are intended to serve as a resource guide for decision makers as well as transportation management and operations staff.

The six case studies associated with this project are TRANSCOM in New York, New Jersey, and Connecticut; TransLink in Vancouver, British Columbia; the Metropolitan Transportation Commission (MTC) in the San Francisco Bay Area; the Intelligent Transportation Systems (ITS) Priority Corridor in Southern California; TranStar in Houston; and AZTech in Phoenix. Case studies were selected to present a variety of approaches that differ in regional size and characteristics, organizational structure, scope, and geography. An executive guide highlights the findings and perspectives from all six case studies.

HOUSTON TRANSTAR

Houston TranStar is a partnership between the Texas Department of Transportation (TxDOT), Metropolitan Transit Authority of Harris County (METRO), City of Houston (City), and Harris County (County) that coordinates regional transportation and emergency management in the Houston metropolitan area. The organizations' pooled-resources model and combined operations center have been recognized nationally and internationally as models for agencies sharing resources across modal and political jurisdictions. Highlights of the TranStar partnership include:

- Integration of multiple transportation and emergency service functions
- A unified, multiagency operations center
- Pooled-funding model for facility operations
- Operations of programs with regionally significant and documented benefits
- In-house development of a regional ITS Architecture.

SERVICES AND ACTIVITIES

Houston TranStar's agencies are responsible for all planning, design, operations maintenance of transportation operations and emergency management operations within the Greater Houston Area. The service area encompasses 5,436 square miles with a population of four million.

TranStar's agencies are responsible for managing a variety of freeway, high-occupancy vehicle (HOV), and arterial street systems including the coordination of ITS programs, emergency management systems, and certain enforcement efforts. The partner agencies coordinate activities through the TranStar Center, a 54,000-square-foot TMC that is jointly owned and operated by the four partners. The co-location of operations and administrative functions from all relevant agencies within one facility enables personnel to work as a team to address the region's transportation needs while still reporting to their home agencies. Organizations and activities operating from the facility include:

TranStar is a platform for cooperation. It's a clearinghouse for sharing information, creating consensus, and leveraging resources.

– Jack Whaley, TranStar Director

- TxDOT: Traffic Operations - Freeway Traffic Management Section; Administration; Accounting; Information System Services; heavy-duty wrecker; Motorist Assistance Program (MAP) dispatch; incident response
- METRO: Police - Dispatch, HOV enforcement; Administration; Bus Dispatch; Traffic Engineering
- Harris County: Traffic Engineering - Signal Systems Section; Office of Emergency Management (OEM); Flood Control District, Sheriff's Office - MAP officers
- City of Houston: Police Dispatch; Traffic Engineering - Signal Systems Section; Office of Emergency Management
- Texas Transportation Institute (TTI) (a research center that supports many of the partners' activities)
- MetroTraffic (information service providers operating from the control center).

From the TranStar Center, these partners jointly manage a number of systems and programs, including:

- 160 centerline mile freeway management system (FMS), out of a projected 300 miles
- Freeway and arterial street incident management
- Flow signals (ramp meters) at 106 ramps
- 257 closed-circuit television (CCTV) freeway cameras
- 100 dynamic message signs (DMS)
- 86.4-mile HOV lane system, out of a projected 105 miles

- Regional traffic signal system of 2,800 signals
- MAP
- Emergency management operations for evacuations and disasters
- Flood alert system.[1]

TranStar also works with the Coroner's Office, the Houston Fire Department, the Port of Houston, the Federal Railroad Administration, and the local Metropolitan Planning Organization (MPO). In addition, three major television networks broadcast live information from the Center through remote camera and data connections.

[1] Houston TranStar, 2001. Houston, TX: Texas Department of Transportation Institute, December 2000. Available from World Wide Web: (*http://traffic.tamu.edu/transtar.html*)

DEVELOPMENT

The Houston region has a long history of cooperative transportation management. TxDOT began a freeway management program in 1963 that included ramp metering and automated monitoring. In 1978, METRO was formed with a local one-cent sales tax and has become a significant player in regional transportation management. It is frequently involved in local roadway capital development projects and operates a 200-person police force. METRO and TxDOT have worked together since the early 1980s to develop an HOV lane system utilizing METRO's contracting capabilities and state right-of-ways. The system has grown to support 87,600 passenger trips per day.[2] TxDOT and METRO also worked together throughout the 1980s and 1990s to implement automated monitoring and DMS on area freeways and HOV facilities.[3]

Recognizing the benefits of cooperation, area transportation leaders met monthly to discuss regional transportation strategy. This "Supergroup" was the precursor to Houston TranStar.

Members of the "Supergroup"

- TxDOT District Engineer
- Harris County Judge
- City of Houston Mayor
- City of Houston Chief of Staff
- Houston METRO General Manager
- METRO, Chairman of the Board
- Chairman, Harris County Toll Road Authority

In the early 1990s, TxDOT was in the process of creating an integrated FMS by connecting its satellite Traffic Management Centers (TMCs) and envisioned a central facility to control all freeway operations. The Supergroup recognized the benefit of coordinating arterial signal system development with the freeway activities. In 1993, TxDOT, METRO, The City of Houston and Harris County formed the Transportation Management and Operations partnership, TranStar. Plans to develop an integrated traffic management system and control center for the Greater Houston region were initiated. Meanwhile, partners began working together through an interim center within TTI.

These plans were accelerated later that year when the U.S. Department of Transportation (U.S. DOT) designated I-10 which passes through Houston, as one of four ITS Priority Corridors to receive dedicated funding authorized by the Intermodal Surface Transportation Efficiency Act (ISTEA) of 1991. Through 1997, nearly $22 million, including state and local agency matching contributions, were dedicated to 26 ITS projects in the region. A goal was established to complete development of the operations facility prior to the Intelligent Transportation Society of America Annual Meeting to be held in Houston in April 1996. This goal kept participants focused and led to the rapid deployment of system components.

[2] Houston TranStar, *Houston TranStar Fact Sheets* (Houston, TX, June 2000), p. 9.

[3] U.S. DOT, *Regional ITS Architecture Development, A Case Study: Houston ITS Priority Corridor* (Washington, DC: U.S. DOT, September 1999), p. 2.

It would have been much harder to develop TranStar if the agencies hadn't already been working together.

– Douglas Weirsig, City of Houston

Leaders recognized the value of a formalized partnership in order to effectively channel ITS funding and follow up on decisions of the Supergroup. Consequently, an Interlocal Agreement was signed between the partners in 1994, forming the TranStar Consortium, with an independent staff and an operating budget composed of contributions by each of the partners.

In 1994, as plans were taking shape for the TranStar facility, a major flood paralyzed the City and made TranStar leaders aware of the critical link between emergency management and transportation operations. Plans were amended to include the City and County OEM in the building design (a natural fit, since the City OEM was seeking new accommodations), and the partnership's vision was altered to include a focus on emergency management.

Organizational Development Timeline

1963	First freeway management projects
1978	METRO authorized local one-cent sales tax
1984	First HOV with camera surveillance opens
1993	TranStar partnership formed
1993	Houston designated as ITS Priority Corridor – 26 projects initiated
1994	TranStar Interlocal Agreement signed
1994	City and County Offices of Emergency Management join TranStar
1996	TranStar center opens in time for ITS America Annual Meeting in Houston
1996	Operations center begins 24-7 operations
1998	Leadership team formed, staff reorganized
1998	TranStar ITS Architecture Development initiated
1998	Bus and police dispatch join TranStar
2000	Partnership with the media initiated
2000	Plans for facility expansion begin
2000	Partnership with the U. S. Coast Guard
2000	Partnership with the Houston Ship Channel Operators

In 1998, the organization underwent a significant staffing and management change. Having completed the initial development of the Center, focus shifted from facility construction and base-systems development to sustaining support for ongoing operations. A new advisory body, the Leadership Team, was initiated to provide separate roles for agency chief executives and top functional managers in the oversight of TranStar. A new TranStar Executive Director was hired and his title changed to Director. The Director restructured the internal staff by replacing oversight responsibilities with more functional roles. These changes began a cultural transition that gave more emphasis to making the concept of a Transportation Management Center (TMC) a functioning reality.

In the last few years additional entities have joined with TranStar, as the benefits of TranStar participation have become apparent. METRO began bus and police dispatch from the Center in 1998. The Harris County Flood Control District became part of TranStar in 2000 when its Flood Alert System was integrated into the TMC. Capabilities for external data and video feeds implemented in 2000 provided remote access to TranStar information and equipment, prompting new partnerships with media organizations. The CBS, ABC, and NBC local television affiliate stations now broadcast TranStar video during their newscasts.

Also in 2000, TranStar began a partnership with the U. S. Coast Guard to monitor flow levels on the San Jacinto River. The Houston Ship Channel Operators are among the most recent beneficiaries of TranStar information, receiving data from wind sensors and river water current meters on bridges across the channel. This latest endeavor represents the consortium's first targeted activities related to freight. Actions are being taken to increase involvement of the City Coroner's Office and the Fire Department because of their important roles in incident management. The Federal Railroad Administration is also interested in partnering with TranStar to implement ITS at railroad grade crossings. A primary component of the TranStar Director's job is to continuously seek and foster these kind of new partnerships.

ORGANIZATIONAL STRUCTURE

Legal Status and Authority

TranStar has no charter or statutory authority. Its responsibilities are those of its constituent organizations, and it exists as a partnership between these agencies established through interlocal agreements. Each agency maintains its autonomy and responsibility for operations activities that fall within its purview. The partnership enables each agency to take advantage of shared resources and coordinates cooperative operations activities, such as incident and event management. The organizational structure is designed to promote equality in decision making and fairness in implementing policies.

Decision-Making Structure

The tiered management structure, of TranStar enables leadership by partner agency personnel at all levels (see Figure 1):

- The Executive Committee comprises the chief executive officers or equivalent from each agency. It meets monthly to set broad policy and determine fiscal policy.
- The Leadership Team administers agency staff assigned to TranStar and develops technical policy for the organization. It meets twice monthly.
- The Agency Managers are located on site to oversee daily operations at the Center. They meet as needed (typically every two weeks) to discuss operational issues.

Figure 1: TranStar Management Structure

Executive Committee	
District Engineer	TXDOT
President & CEO	METRO
Director of Engineering	Harris County
Director of Public Works	City of Houston

Leadership Team	
Chief of Police	METRO
Manager Traffic & Transportation Group	Harris County
Emergency Management Coordinator	Harris County
Director of Transportation Operations	TXDOT
Executive Liaison	Harris County
Emergency Management Coordinator	City of Houston
Deputy Director of Public Works	City of Houston

Figure 1: TranStar Management Structure (Cont.)

Agency Managers	
Emergency Mgmt. Deputy Coordinator	Harris County
Manager, Transportation Mgmt. Systems	TXDOT
Captain, TranStar Division	METRO
Information Resources Administrator	TXDOT
Emergency Mgmt. Deputy Coordinator	City of Houston
Traffic, Deputy Assistant Director	City of Houston
Traffic Management & Operations	Harris County
Manager, Transportation Mgmt. Systems	METRO

All policy decisions must be approved by the Agency Managers and Leadership Team before final approval by the Executive Committee. This ensures support from those who will be implementing policies and minimizes the time requirements of the executives by leaving negotiations to the lower-level groups. The Leadership Team was not part of the original TranStar agreement, but was added in 1998 to provide an intermediary between the on-site operations staff and the executives of the partner agencies.

Although the Interlocal Agreement requires only a majority vote for the approval of policies, most decisions are debated until all parties reach consensus. This is practiced at all levels of decision making. The participants feel that consensus is important to the success of the organization, since it depends on partners meeting voluntary commitments.

TranStar is not just an administrative body. It is also a legislative body. It makes decisions for the region. It works because multiple levels of people are involved. You have to have people with funding authority and operational experience.

– John Gaynor, Texas Department of Transportation.

Governing Documents

TranStar documentation provides guiding principals, regular assessments of progress toward agency goals, and promotion of agency activities. Key documents include:

- The Interlocal Agreement, the organization's founding contractual agreement, which specifies broad requirements concerning the primary functions of the organization, staffing, budgeting procedures, facility ownership rights, and the division of responsibilities and funding commitments among parties. Specific program responsibilities are governed by individual program contracts between the relevant parties.
- The *Houston TranStar Strategic Plan* was developed in 1997 by the partnering agencies. The plan defines 10 objectives that are essential to achieving Houston TranStar's mission and goals.
- *Houston TranStar Annual Reports* describe progress toward achieving goals and objectives. The documents also provide benefit estimations and recommendations for future activities.

- The *Freeway Incident Management Plan and Procedures* outlines the roles of each responding agency during incidents and events. METRO, as the largest police force for the transportation system, maintains this document.
- A TranStar Operations Manual is planned for future development. The manual will include discussion of the responsibilities of and procedures for control room personnel.

RESOURCE MANAGEMENT

The TranStar partnership is based on a combination of pooled resources and individually owned, but shared, resources. For instance, the facility, central computer system, and central telecommunications system within the facility were developed and are maintained with pooled funds through the TranStar budget. Devices in the field are funded, implemented, owned, and maintained by individual agencies. However, access to individually owned equipment and data is shared within the TranStar facility. Staffing is a similar hybrid. Pooled funding supports a small administrative staff, whereas operations staff reports to the individual agencies.

TranStar is like a potluck dinner. Everyone brings something to the table and benefits from what everyone else does.

– John Gaynor, Texas Department of Transportation.

Because TranStar is not a legal entity, it relies on its constituent agencies for all corporate functions. In framing the partnership, TranStar founders sought to leverage the strengths of each partner while balancing responsibilities equitably. This created buy-in and interdependency among the partners. Figure 2 indicates the primary responsibilities of each partner.

Figure 2: TranStar Division of Responsibilities

AGENCY	RESPONSIBILITY
TxDOT	Facility site acquisition, preparation, and clean-up management Equipment procurement Facility construction Computer system hardware and software development, system integration, and maintenance
METRO	Facility site environmental analysis Facility engineering and design Telecommunications system development and maintenance
City	Bookkeeping Staffing
County	Facility physical maintenance

Assets

The 54,000-square-foot Houston TranStar facility includes a central control operations room, communications room, telephone switch room, briefing and emergency operations center, and three floors of offices for staff of the participating agencies. The building also contains public viewing areas and media briefing rooms where the public and news media can learn more about the Center's operation and monitor information during special and emergency events.

Development of the $13.5 million Center was a joint effort of the partners, with each agency contributing to the overall development cost according to a predetermined ratio (TxDOT - 64 percent, METRO - 23 percent, City - 10 percent, and County - 3 percent). TxDOT and METRO were able to apply Federal funds to their portions.

An expandable building design is critical for accommodating new growth.

– Jack Whaley, TranStar Director

A $5.3-million expansion is planned to accommodate additional law enforcement and emergency service participation and to build an auditorium that could double as a bunkroom during hurricane and flood response activities.

Each entity is responsible for the installation, operation, and maintenance of field equipment on its own right-of-way. Data from field equipment is fused at the TranStar facility and becomes accessible to all organizations within the control room. Agencies can control field equipment (cameras and DMS) belonging to other organizations. However, each agency maintains ultimate authority over its own equipment and data. Agencies are also individually responsible for connecting their field equipment to the central system and for furnishing their own operations consoles and office spaces within the facility.

Staffing

Operations staff and their managers from multiple agencies work together within the TranStar Center to carry out individual agency operations responsibilities as well as joint operations programs. These staff have space within the shared control room and also have independent office space within the facility. Figure 3 indicates on-site staffing levels from each agency.

Figure 3: Permanent Staff Located at TranStar

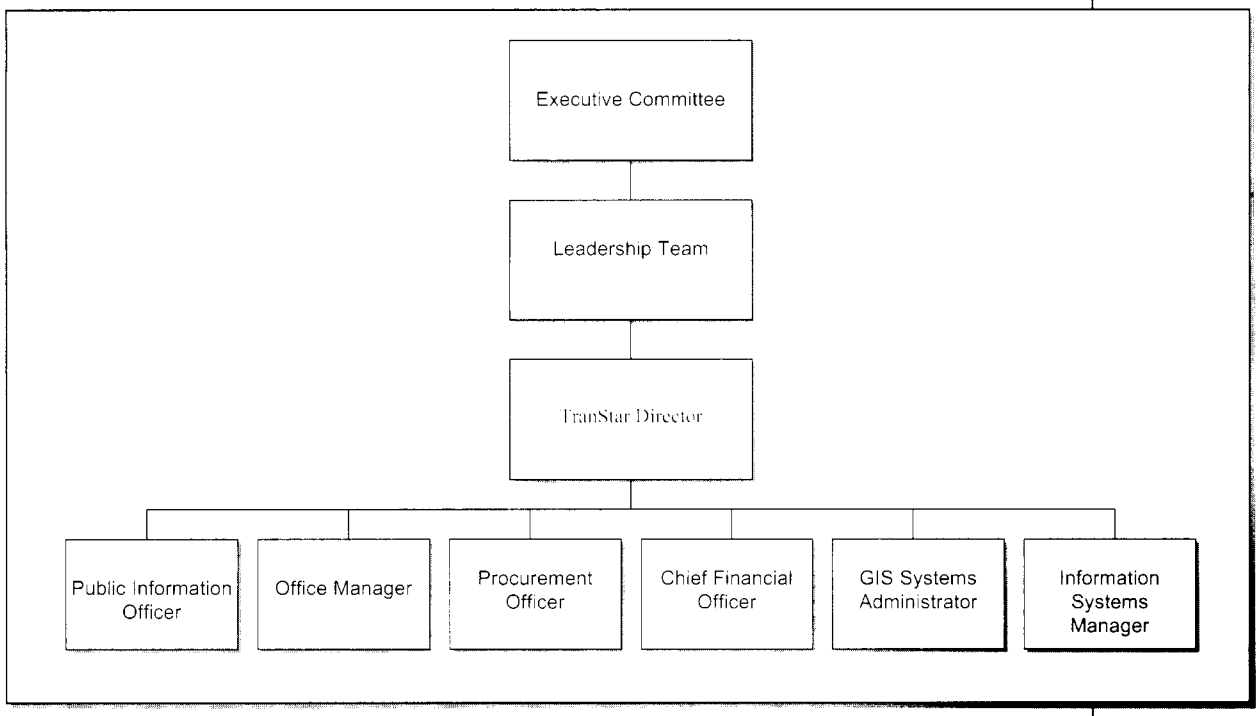
AGENCY	TxDOT	METRO	City	County	TranStar
STAFF	20	15 permanent 30 field*	14	5	11**

* METRO dispatches its field personnel from the Center and also rotates field personnel into the control room.

** TranStar employees are technically, City employees.

An eight-person TranStar staff provides administrative support. These staff are technically City employees, but function as TranStar employees. Their salaries are funded through the TranStar budget, they have TranStar business cards, and only perform duties related to the organization. They are conscientious about being viewed as neutral, not favoring any partner. These staff report to the TranStar Director, who reports to the Leadership Team, as indicated in Figure 4.

Figure 4: TranStar Staff Organizational Chart



Many of these staff positions were created during the 1998 reorganization in order to address specific needs:

- The Chief Financial Officer keeps accounts. Clear records of agency contributions eliminated concerns about some agencies contributing more than others and provided for timely reimbursement from the consortium fund for agency contributions to the Center.
- The Procurement Officer follows up on TranStar-related procurement activities within the agencies. This reduces procurement time by ensuring that procurements for TranStar receive the same attention as other agency procurement activities.
- The Public Information Officer organizes the media, handles external publicity, and coordinates internal communications.
- The Office Manager coordinates internal logistics among the individual agencies' administrative staffs.
- The Information Systems Manager supports the computer systems. Recent (2000) transfer of this role from TxDOT to TranStar promoted neutrality among the partners. Four staff work under the information systems manager.

Funding

TranStar's annual budget allocates funds for employee salaries and facility maintenance and overhead (the operating budget) and provides an escrow for local matches to Federal funding (the supplemental budget). The operating budget also includes a contingency fund for unanticipated expenses. Funding to support operations of specific programs, agency-owned equipment, and operations staff comes from individual agencies and is not included in the TranStar budget.

The operating budget is typically around $2 million annually. Costs are allocated among the TranStar participants through a formula based on building occupancy (office space and total square footage), computer and telecommunications equipment usage, and operating time (system support requirements). Cost Allocations for FY 2001 are indicated in Figure 5.

Figure 5: TranStar Revenue Budget Cost Allocations for FY 2001

	Harris County Trans.	Harris County OEM	City of Houston Trans.	City of Houston OEM	METRO	TTI	TxDOT
COST ALLOCATION RATIO	7%	7%	17%	7%	23%	1%	38%

The supplemental budget ensures that local matches are available to leverage Federal funds and is supported by the partners according to predetermined ratios (City - 30 percent, TxDOT - 30 percent, Metro- 30 percent, County - 10 percent). These funds reimburse TxDOT and METRO, who manage federally funded projects through a contract with TTI.

We are using existing resources to do new things without needing new funds.

- Jack Whaley, TranStar Director

Since its inception in 1994, TranStar has received approximately $27 million in Federal allocations, through Congestion Mitigation Air Quality (CMAQ), Surface Transportation Program (STP), Federal Transit Administration (FTA), and Federal Highway Administration (FHWA) Priority Corridor funding, which has been used primarily to support new programs. STP funds are beginning to be used for operations and maintenance. However, TranStar must compete with traditional highway maintenance needs for these funds.

Private-Sector Revenue

TranStar provides data access to the private sector in exchange for a fee. Three services are available:

- The first allows participants to receive five real-time video images, one of which they can select from any TranStar camera. Participants must pay $5000 yearly. Three television networks currently receive this service.
- In exchange for Public Service Announcements or $2,500 yearly customers can receive real-time speed data directly from the system. One information service provider currently participates.
- The final service enables information service providers (ISPs) to operate directly from the control room with access to the TranStar computer system in exchange for a fee for space and computer usage. Two contracts are being negotiated for this service.

Private-sector participants enter a 1-year service contract with TxDOT for these products. Key terms of the license agreements include:

- Participants must provide written or verbal credit to TranStar for any information publicized.
- Participants must install their own equipment, hardware, software, and video feeds to access data, using TranStar's system integrator.
- Secondary sale or use of the data is permissible with approval from TranStar management.

The funds from these initial agreements were used for information security software installation to allow for the video sharing.

Some of TranStars programs also represent public private partnerships. The Motorist Assistance Program (MAPS), which aids stranded motorists on area freeways, is an example. County Sheriff deputies operate the assistance vehicles. METRO provides compensation for the deputies' salaries. TxDOT dispatches vehicles through the Sheriff Department's radio. Area cell phone companies provide free emergency calls to a designated number. The Houston Automobile dealers association provides four free vans per year, and fuel companies donate fuel in exchange for advertisements on the vans.

BENEFITS AND KEY ACHIEVEMENTS

Improvements in Transportation System Operations

The Texas Transportation Institute monitors annual benefits from TranStar based on reductions in projected congestion costs. For 1999, benefits in reduced congestion and fuel consumption were estimated to total $95 million (60 percent from general traffic operations and management, 40 percent from incident and event management). The estimated total annual cost of TranStar programs was $18 million, resulting in a benefit/cost ratio of 5.3.[4]

Improvements in Institutional Operations

TranStar partners constantly seek ways to improve operations through partnerships. These partnerships result in significant benefits to the agencies and improve their ability to manage the transportation system. Some examples include:

- *Sharing responsibilities* - When TxDOT experienced funding shortfalls for operations of its automated vehicle identification project, the TranStar partners provided the additional funding necessary to keep the project operational.
- *Developing redundant systems* - A shared resource agreement will allow Harris County and TxDOT equal access to optical fiber on each other's right-of-ways, enabling redundancy in case of breakage. The positive working relationship established through TranStar enabled the contract to be written with minimum specifications, decreasing institutional barriers to implementation.
- *Utilizing partners' resources* - The OEMs have used TxDOT's video cameras to assess flooding situations and view tornadoes. The visual image can give faster information than models.
- *Integrating resources* - Prior to participation in TranStar, the City and County OEMs operated independently. Co-location within TranStar enabled development of a single emergency management plan that incorporated the strengths of each, the County's active stream and drainage channel monitoring, and the City's superior weather information systems.

[4] Houston TranStar, *Houston TranStar Annual Report-1999*, (Houston, Texas: Texas Transportation Institute, September 2000).

- *Facilitating new relationships* – TranStar set up a meeting among the Harris County Sheriff's Department, the Houston Police Department, and the TxDOT Heavy Vehicle Recovery Unit to address a problem with truck accidents on one segment of road. Previously unaware of the existence of the TxDOT Heavy Vehicle Recovery Unit, the three organizations were not only able to develop a plan for the roadway at hand, they also vowed to work together to address other problems.
- *Sharing expertise* – Harris County, an experienced signal system operator, assisted METRO in the implementation of a new signal system, thereby reducing the need for outside consultants.
- *Streamlining processes* – Policies implemented through TranStar's incident management program eliminated the need for secondary accident investigations by the Coroner's Office. The police collect information needed for both organizations, thereby speeding incident clearance and reducing personnel time.
- *Supporting partners' activities* - METRO buses are available for emergency evacuations and have been used as mobile recovery units for fire-fighters suffering from heat exhaustion.
- *Promoting partners' activities* – TxDOT's dynamic message signs are used to encourage bus ridership, car pooling, park and ride for special events, ozone action days, and other transportation initiatives when not being utilized for traffic management.

CHALLENGES AND BEST PRACTICES

Developing a Sustainable Organization

TranStar is like an organism that grows. It is hard to plan. It grows through opportunities.

– Jack Whaley, TranStar Director

Several factors were critical to the development and growth of TranStar:

- *Importance of a champion* - Bob Lanier was a strong proponent of regional transportation management and was the visionary for the TranStar partnership. Mayor of Houston at the time of TranStar's formation, he had also served as Houston METRO Chairman and TxDOT Commissioner. He engaged the personnel necessary to make the partnership a success, hired the first TranStar staff through the City, and protected funds for TranStar within the City's budget.
- *Creating buy-in through contribution* - Dividing TranStar responsibilities among the agencies allowed the organization to benefit from each agency's strength and fostered a sense of commitment from the partners.
- *Changing management needs* - In its formative years, TranStar required personnel who were establishing new concepts within the existing regional transportation agencies. As the organization matured, personnel with the skills to build upon and expand these concepts into productive, fully implemented products became more important.
- *Assigning responsibility for partnership building* - Part of the Director's job is to seek new partnership opportunities. Needs identified through the local media are often the source of new opportunities.

Building a Multiagency Team

Unifying multiple organizations took much longer than most participants expected. TranStar evolved slowly from a building in which separate organizations worked side by side, into a unified team comprising multiple organizations that trusted and relied on one another. This transition was attributed to a number of factors:

- *Physical co-location* - Working side by side on a daily basis at TranStar establishes trust and creates an understanding among the agencies of each other's activities, needs, and resources that would not be possible from meetings alone.
- *Co-development of Houston TranStar architecture* - In-house development of a regional ITS architecture served as a team-building exercise for the participants.

- *Rotating staff* - METRO rotates field personnel into the control center to help them understand the cooperative environment and needs of the other agencies. Based on the positive results, the City and County are now doing the same.
- *Involving team players* - Agencies that emphasized teamwork, through training and replacing staff, were most successful within the TranStar environment.
- *Addressing cultural differences* - Small cultural differences, such as different policies among agencies about eating in the control center, can lead to ill will among staff. Addressing these differences promptly is important for building trust.
- *Maintaining neutrality* - The TranStar staff take great care to be viewed as neutral TranStar employees rather than City employees. Having a neutral meeting space and staff were important for creating an equal playing field and enhancing trust among participants.

When we started developing emergency response plans, the hardest part was getting everyone to come to the table. Now its no longer a question. Everyone attends debriefings.

– Captain Tim Kelley, METRO Police

Addressing Operational Challenges

Funding operations and management - While capital development costs for most projects are shared, ongoing operations costs generally fall to an individual agency. In addition, many of the Federal sources used to provide new development funds do not support ongoing operations. This creates a tendency to over investment in developing programs without adequate consideration of ongoing operations and maintenance requirements. Many TranStar participants are concerned about their ability to continue funding operations and necessary equipment upgrades over a sustained period.

Do the most natural projects first. Do these well before tackling the unknown. Work out administrative problems first before tackling technical problems. Communication is the key.

– Andy Mao, Harris County

Integrating outlying areas - As neighboring cities and regions begin to implement ITS, there is concern that these systems be compatible with TranStar. The TranStar partners are considering ways to implement satellite systems into the network. TranStar leaders concede that in many cases the biggest problem is lack of communication - outside jurisdictions do not know about TranStar. As a result, additional effort is being focused on marketing and external communication.

Planning for different budget cycles - TranStar's budgeting cycle coincides with the City's. However, each partner has a different fiscal year and budgeting cycle. This requires some partners to estimate TranStar expenditures years in advance and plan these into their annual budgets. This can limit spending flexibility for individual agencies and increases the need for TranStar to have a contingency fund in case of shortfalls.

SELECTED BIBLIOGRAPHY

Houston TranStar, *Houston TranStar Fact Sheets,* Houston, Texas, June 2000.

Houston TranStar, *Houston TranStar FY 2001 Proposed Budget,* Houston, Texas, December 1999.

Texas Department of Transportation, *Houston TranStar - Interagency Agreement,* Houston, Texas, July 1994.

Texas Department of Transportation, *License Agreement for the Use of the Texas Department of Transportation Houston District Intelligent Transporta-tion System Closed Circuit Television Video Images and TranStar Logo,* Houston, Texas, 2000.

Texas Transportation Institute, Houston TranStar, Houston, Texas, 2000. *http://traffic.tamu.edu/transtar.html*

Texas Transportation Institute , *Houston TranStar Annual Report-1999,* Houston, Texas, September 2000.

U.S. Department of Transportation, *Metropolitan Transportation Management Center, A Case Study on Houston TranStar: Maximizing Safety and Mobility for the Public,* Washington, DC, October 1999.

U.S. Department of Transportation, *Metropolitan Transportation Management Centers Concept of Operations, A Cross Cutting Study: Improving Network Efficiency,* Washington, DC, October 1999.

U.S. Department of Transportation, *Policy Review of the ITS Priority Corridors,* Washington, DC, January 1997.

U.S. Department of Transportation, *Regional ITS Architecture Development, A Case Study: Houston ITS Priority Corridor, Building a Framework for Regional ITS Integration,* Washington, DC, September 1999.

Federal Highway Administration
Operations Core Business Unit
400 Seventh Street, SW
Washington, DC 20590

Visit our Web site at
www.ops.fhwa.dot.gov

U.S. Department of Transportation
Federal Highway Administration

Federal Transit Administration

Publication No. FHWA-OP-01-139